

**CIGNA 401(k) Plan: Benefit to Removal of Trading Restrictions on  
Company Match Portion of CIGNA Company Stock**  
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This report provides estimates of the total benefit that CIGNA employees would derive from the removal of the trading restrictions on the Company Match portion of CIGNA Company Stock within their 401(k) plans. The values of the dollar benefits computed and described below apply to March 14, 2005.

Under the old rules for a CIGNA 401(k) Plan participant, half the Company Match contributions were invested in CIGNA common shares (henceforward "Company Stock") and were not permitted to be traded until the participant reached age 55, or when his employment at CIGNA was terminated. Under the proposed new rules, that restriction is to be immediately lifted. In what follows, I use the term "locked" stock for Company Stock that is in the Company Match portion and subject to trading restrictions under the old rules.

Here is a brief description of the valuation method that was used. Economic models of portfolio choice assume that risk-averse investors prefer more average return at each level of risk, and they prefer less risk at every level of average return. The inability to sell and reallocate a portion of his portfolio represented by Company Stock is a restriction that forces an employee into an inefficient portfolio allocation. If his first-best allocation -- that portfolio that he would choose in the absence of any restriction -- includes a smaller fraction of Company Stock, then he will typically benefit from a higher average return and a lower risk when he is permitted to sell the restricted Company Stock within his portfolio.

By looking at an investor's portfolio composition we can assess its risk level in the presence of a restriction on trading; and then ask how much additional return he would get if he elected to hold a portfolio with the same risk level but in the absence of this constraint. That additional return arises due to the fact that he can now take greater advantage of the return and risk opportunities available in the capital market when the

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restriction is lifted. Put another way, he moves from a return-to-risk ratio in his constrained portfolio to a higher return-to-risk ratio at his chosen level of risk when the restriction is lifted. We can then convert that additional return into a current dollar benefit number under additional assumptions.

In order to provide a measure of the dollar value of the removal on the trading restriction in these Plans, I must make economic assumptions regarding, *inter alia*, (a) the risk of CIGNA stock and its relation to the risk and return of a feasible, efficiently diversified portfolio of investments; (b) the fraction of CIGNA stock that the participant has in his overall retirement portfolio that is subject to the restriction, which is a measure of his exposure to the Company Stock; and (c) the number of years until the restriction was to be lifted in the absence of the settlement.

There is some empirical evidence that the typical 401(k) plan participant is not well diversified and that the younger the participant, the larger is the share of Company Match stock in his overall retirement portfolio. I have used the data provided to me regarding the age and (Company Match) shareholdings of the employees and computed the dollar benefits to employees from the removal of the lock. I estimate the dollar benefit under two (extreme) sets of assumptions: in the first, that the employees' Company Match shares are a relatively small fraction of their overall savings for retirement, and that fraction ranges from 10% to 70% as the employees' five year age bracket declines from the oldest Age Group of 50-55 year old employees to the youngest Age Group of 20-25 year-olds. For the purpose of discussion, I call the first estimate "Aggregate Benefit (1)". In the second, I estimate the dollar benefit under the assumption that the employees' Company Match shares are a relatively large fraction of their overall savings for retirement, and that fraction ranges from 30% to 90% as the employee age bracket declines from Age Group 50-55 to 20-25. Again, for the purpose of discussion I call the second estimate "Aggregate Benefit (2)". We can think loosely of the first as an estimate applicable when employees are strongly-motivated to save for retirement and the second estimate where they are weakly-motivated to save for retirement.

The estimates of the dollar benefit to employees that are given below use a valuation technique that presumes that the Capital Market offers risk and return opportunities that an employee would have utilized efficiently, and that the Company Match portion that is locked forces him to a sub-optimal position in which he places the remainder of his (unrestrained) investment in a diversified, low-cost basket of equity investments such as an S&P500 Index Fund. Note that this investment vehicle is a commonly-used benchmark for a diversified portfolio of equities, and it was a feasible investment option within the menu available to all employees.<sup>2</sup>

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<sup>2</sup> See the CIGNA 401(k) Plan (Known as the CIGNA Savings and Investment Plus Plan prior to January 1, 1998)(As Amended and Restated Effective January 1, 1997), and amendments thereto.

This method<sup>3</sup> requires additional parameters, most notably the risk (standard deviation) of CIGNA stock and of the S&P500 benchmark, the beta or systematic risk of CIGNA with respect to the S&P500, and a measure of the risk premium offered in the market (the reward to risk bearing, or the price of risk; I chose 6%). The standard deviation of CIGNA and the S&P500 used were 30% and 13% respectively; the market risk (sometimes called systematic risk or *beta*) of CIGNA used was 1.3. These risk estimates were computed from Bloomberg's service using one year of data prior to March 14, 2005, and in my judgement they are reasonable parameters for the computations made here. Like all model parameters, they are subject to error, but the error they introduce is likely to be a smaller source of concern than the error introduced by a lack of knowledge of the employees' demographics (age, share ownership, and composition of their individual overall retirement portfolios).

Table 1 (attached to the end of this report) provides estimates of the dollar benefit to the employees within the CIGNA 401(k) Plan. The total number of shares that are locked (under the Plan rules in effect on March 14, 2005) in this Plan is 833,141, across 16,942 employees. The column headings of the Table indicate the seven Age Group brackets into which I grouped the employees: 20-25, 25-30, ..., 50-55; the last row of the Table indicates the number of restricted shares owned by the employees in each of these age groups. The distribution of ownership indicates that the number of locked shares owned by the youngest group (20-25 years) is small, although the Plan rules would on average prohibit trading those shares for 32½ years; the oldest group (50-55) owns a sizable number of locked shares but they are only prohibited from trading them for 2½ years on average.

The dollar entries in Table 1 shows each Age Group's implied dollar value of the unlocking, for alternative assumptions regarding the fractions that their locked stock represents on March 14, 2004 of their own total retirement savings. Suppose a 32½-year old "representative stand-in" employee-investor of the Age Group 30-35 owns *all* the locked Company Match shares for that Age Group in the Plan; and further that that hypothetical employee has the remainder of the Age Group's total retirement savings invested in the S&P500 Index Fund, so that the Company Match shares corresponds to the fraction (say 0.20) of the total Group retirement savings, shown in the rows. Using the row corresponding to the 0.20 fractional locked stock ownership and the column corresponding to Age Group 30-35 in Table 1, we find that that representative employee would have an immediate benefit to having the Company Stock unlocked, in the dollar amount \$3,912,610.

As can be seen from the Table, the aggregate benefit numbers decrease as the representative employee's Age Group approaches 50-55, and the aggregate benefit numbers increase the larger is the holding of locked stock relative to his total retirement

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<sup>3</sup> For details regarding the model and the computation see E.F. Fama, "Components of Investment Performance," *Journal of Finance*, v27(3),551-67; and L. Meulbroek, "Company Stock in Pension Plans: How Costly is it?", Harvard Business School, Working Paper 02-058, 2002.

portfolio. The data indicate that the younger employees in CIGNA own a very small portion of the locked shares – the bulk of the locked share ownership is in the hands of those over age 30. The older employee typically has some private retirement savings, as well as a large fraction usually in residential real estate ownership, so that the amount of locked stock from the Company Match as a fraction of his overall retirement portfolio is likely to be smaller than that of a younger employee. I do not have detailed information on the dollar value and the composition of the aggregate (privately-held plus 401(k) Plan) savings across the Age Groups: so I chose to compute the Aggregate Benefit to the Unlocking by assuming that the fraction that the locked stock represents in the Age Group's overall retirement savings increases across the successively younger age groups, starting at Age Group 50-55.

These computations are shown by example in the Appendix that is attached to the end of this report. In that Appendix I show, by example, two extreme computations of the aggregate benefit of removing the lock to employees in the CIGNA 401(k) Plan. The first number, \$24,180,337, is labeled “**Aggregate Benefit (1)**” and is the sum of the benefits to each age group, assuming that the oldest age group (50-55) has its ownership of locked stock comprising 10% of its own retirement portfolio, and the youngest age group (20-25) has its ownership of locked stock comprising 70% of its own retirement portfolio; the remaining intermediate age groups have staggered fractions of Company Match stock, as detailed in the Appendix. These assumptions are consistent with the groups having relatively smaller fractions of their retirement portfolios in locked Company Stock.

The second number, \$30,011,668 labeled “**Aggregate Benefit (2)**” is the sum of the benefits to each age group, assuming that the oldest age group (50-55) has its ownership of locked stock comprising 30% of its own retirement portfolio, and the youngest age group (20-25) has its ownership of locked stock comprising 90% of its own retirement portfolio (detailed further in the Appendix). These assumptions are consistent with the groups having relatively larger fractions of their retirement portfolios in locked Company Stock.

Based on this analysis, I estimate that the total benefit to all lies between these two aggregate benefit numbers, \$24,180,337 and \$30,011,668.

I have made these valuations conditional on the Plan participant staying employed at CIGNA until age 55; the Plan's rules prescribe that the Company Stock in the employee's Plan becomes unlocked if he or she was terminated. The (actuarial) prospect of early termination would imply that the benefit numbers to the immediate unlock shown in Table 1 are likely to overestimate the expected true benefits. On the other hand, I have ignored the benefits that the immediate unlock would confer on the employee's Company Match stock that will be received *in the future*: this would imply that the benefit numbers shown in the Table are likely to underestimate the true overall benefit to the immediate unlocking of current and future Company Stock contributions. Without additional information regarding employment spans and future employee benefits, it is not possible to explicitly incorporate these two considerations into the valuations. In my opinion, the lower figure (\$24,180,337) would be a conservative estimate of the overall benefit, given these potentially offsetting but omitted considerations.

My analysis has assumed that the balance of the average employee's portfolio is invested efficiently in a diversified basket of equity investments earning the best achievable return to risk ratio. (As noted above, I chose the S&P500 Index as the alternative diversified basket, and that investment vehicle was in the menu of Plan investment vehicles that an employee could have chosen.) This is a working assumption that is very optimistic indeed, because we know that many employees choose undiversified positions with additional investment in Company Stock made from their own contribution into their 401(k) plans, and for these employees removing the restriction on trading the company match portion would provide no benefit. For those employees who elect not to place any money from their own contribution into Company Stock but who have made inefficient portfolio allocations, the numbers in the table provide guidance --- they can be viewed as an anticipated benefit --- as to the benefit from removing the restriction. To the extent that investment education further facilitates the diversification out of Company Stock (acquired from the employees' own contributions) the employees stand to benefit more.

A handwritten signature in black ink, appearing to read "Krishna Ramaswamy", with a stylized flourish at the end.

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TABLE 1: CIGNA 401(k) Plan

Fraction of Emp. Port represented by Locked Stock	Aggregate Dollar Benefits To Removal of Trading Restriction on Company Stock for Employee Age Group							
	Age 20-25	Age 25-30	Age 30-35	Age 35-40	Age 40-45	Age 45-50	Age 50-55	
0.05	\$201,651	\$964,645	\$1,229,191	\$960,604	\$886,958	\$606,081	\$210,001	
0.10	\$364,612	\$1,764,963	\$2,276,139	\$1,800,562	\$1,683,160	\$1,164,621	\$408,678	
0.20	\$601,754	\$2,971,910	\$3,912,610	\$3,161,555	\$3,020,655	\$2,137,484	\$767,543	
0.30	\$756,712	\$3,796,468	\$5,081,435	\$4,177,772	\$4,064,636	\$2,931,270	\$1,073,607	
0.40	\$860,118	\$4,368,296	\$5,923,777	\$4,938,804	\$4,877,038	\$3,573,109	\$1,330,744	
0.50	\$931,174	\$4,774,338	\$6,541,843	\$5,515,806	\$5,513,483	\$4,092,650	\$1,545,799	
0.60	\$981,570	\$5,070,464	\$7,005,328	\$5,960,710	\$6,018,061	\$4,516,152	\$1,726,036	
0.70	\$1,018,427	\$5,292,231	\$7,360,752	\$6,310,060	\$6,423,757	\$4,864,811	\$1,877,970	
0.80	\$1,046,152	\$5,462,466	\$7,639,171	\$6,589,318	\$6,754,685	\$5,155,022	\$2,007,018	
0.90	\$1,067,540	\$5,596,095	\$7,861,561	\$6,816,298	\$7,028,385	\$5,399,262	\$2,117,528	
Restricted Shares Owned	14,069.25	78,509.81	120,680.10	119,670.89	152,662.76	171,569.82	175,978.34	

## Notes:

1. The dollar figures are estimates of the benefit to employees from the removal of the trading restriction on the CIGNA Company Stock derived from the Company Match portion of their 401(k) plans. The figures are computed for each age group (column-wise) and for several hypothetical fractions (row-wise) of the total retirement savings that the restricted Company Stock represents, for that age group. These estimates use data as of March 14, 2005 and the benefit numbers are computed for that date.
2. The additional market assumptions used are as follows: Share Price on March 14, 2005 = \$89.64, the risk premium per annum on the diversified benchmark index (here the S&P500) chosen was 6%; the annual standard deviations of the return on the S&P500 and CIGNA stock were assumed to be 13% and 30% respectively; and the market risk (sometimes called beta or systematic risk) of CIGNA was assumed equal to 1.3.
3. For details of the model used, see E.F. Fama, "Components of Investment Performance," Journal of Finance, v27(3), 551-67; and L. Muelbroek, "Company Stock in Pension Plans: How costly is it?", Working Paper 02-058, Harvard Business School.



**APPENDIX**  
**Examples of Computations of Aggregate Total Benefits to Removal of Trading Restrictions on Company Stock in the CIGNA 401(k) Plans**

Here are two computations of the Aggregate Benefits to all employees from the removal of the trading restriction in the CIGNA 401(k) Plans. Both computations use the benefit numbers reported in Table 1 for each age group and for various fractions of restricted stock owned by these age groups.

1. Suppose that for the employees in the Age Group 50-55 with on average  $2\frac{1}{2}$  years remaining until age 55 (when the unlock would occur under the old Plan rules), their holdings of restricted stock represented 10% of their overall savings for retirement, so that the benefit to them of removing the lock can be read off from Table 1 as \$408,678. Suppose that for each successive group of younger employees their holdings of restricted stock represented successively larger fractions of their retirement savings – so that for Age Groups 45-50, 40-45, 35-40, 30-35, 25-30, and 20-25 their holdings of restricted stock were 20%, 30%, 40%, 50%, 60% and 70% respectively of their own retirement portfolio values, implying dollar benefits that are shown in Table 1 in the corresponding rows and columns. Then the Aggregate Benefit would be the sum of all these dollar figures:  
 $\$408,678 + \$2,137,484 + \$4,064,636 + \$4,938,804 + \$6,541,843 + \$5,070,464 + \$1,018,427 = \$24,180,337$ ,  
 which I call **AGGREGATE BENEFIT(1)**.

2. For the second computation I assumed that the oldest (50-55) Age Group's ownership of locked stock constituted 30% of their retirement savings; and that each successive younger group held restricted stock that constituted successive increments of 10% of their respective total retirement portfolios, until 90% for the youngest (20-25) Age Group; by using Table 1, as we just did in Item 1 above, we can compute the sum of the benefit numbers as:  
 $\$1,073,607 + \$3,573,109 + \$5,513,483 + \$5,960,710 + \$7,360,752 + \$5,462,466 + \$1,067,540 = \$30,011,668$   
 which I call **AGGREGATE BENEFIT(2)**.